



**UPPER WEST SIDE
WATER, WASTEWATER SERVICING AND STORMWATER
MANAGEMENT OVERVIEW REPORT**

City of Hamilton

Prepared for:

Upper West Side Landowners Group

Project #: 17-556

July 2020

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1.0 INTRODUCTION

The Hamilton Airport Employment Growth District (AEGD) Secondary Plan (Official Plan Amendment OPA 35) was approved on February 17, 2015 by the Ontario Municipal Board (OMB), based on the Minutes of Settlement signed by the City of Hamilton, Silvestri Investments, Upper West Side Landowners Group, and Craig Smith.

The AEGD is intended to provide a major business park development which effectively integrates with the existing John C. Munro Hamilton International Airport, the residential development abutting Garner Road / Twenty Road, as well as respects and enhances the prominent natural areas throughout the Secondary Plan Area.

The Upper West Side lands are located within the northern portion of the Hamilton Airport Employment Growth District (AEGD) Secondary Plan Area and are bounded by Twenty Road West to the north, Glancaster Road to the west, Dickenson Road to the south and Upper James Street to the east (shown on the attached **Location Plan – Figure 100**).

The UWSLG is proposing the expansion of the Urban Boundary to include portions of a “white belt” parcel, for the purposes of creating a complete community. This report supports this expansion. The portion to be added to the Urban Boundary is proposed to include residential uses, an enhanced natural heritage system, stormwater management ponds, and a proposed collector road network. It is important to note that the proposed development is seeking only the expansion of the urban boundary for the “Western”, “Central”, and “Eastern” “white belt”; the remaining parts are subject to separate applications but have been planned comprehensively. In addition, following submission of the Urban Boundary Expansion applications for the 3 “white belt” areas, a Secondary Plan, supported by all necessary technical studies, will be submitted.

The UBE and all future studies will follow the recommendations of the background studies listed below:

- AEGD Phase 2 Water/Wastewater Servicing Master Plan Update
- AEGD Transportation Master Plan-Implementation Update (December 2016)
- AEGD Water & Wastewater Servicing Master Plan (June 2011)
- AEGD Water & Wastewater Servicing Master Plan-Update (December 2016)
- AEGD Subwatershed Study & Stormwater Master Plan (June 2011):
 - Part A: Subwatershed Study
 - Part B: Stormwater Master Plan
- AEGD Subwatershed Study & Stormwater Master Plan Implementation Document Version 2.2 (April 2017)
- AEGD Eco-Industrial Design Guidelines (Draft May, 2010)
- AEGD Urban Design Guidelines (August, 2010)
- Airport Employment Growth District Secondary Plan (OPA 35, September 2017)
- City of Hamilton Stormwater Source Control Policy for Industrial, Commercial and Instructional (ICI) Land Uses (February, 2014)
- Stormwater Infrastructure Design (Philips Engineering Ltd., September 2007)
- Low Impact Development Stormwater Management Planning and Design Manual, Version 1.0 (CVC/TRCA, 2010)
- Stormwater Management Planning and Design Manual (MOE, March 2003)
- Twenty Mile Creek Watershed Plan (NPCA, 2006)

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- Niagara Peninsula Conservation Authority (NPCA) Policies, Procedures and Guidelines for the Administration of Ontario Regulation 155/06 and Land Use Planning Policy Document (October 19, 2011)
 - Low Impact Development Stormwater Management Guidance Manual (MOECC, 2017)
 - City of Hamilton Comprehensive Development Guidelines and Financial Policies Manual (2017)
 - Innovative Stormwater Source Control Policy for Industrial, Commercial and Institutional Land Uses (AMEC, April 2013)
 - Preliminary Desktop Hydrogeological Investigation (Exp Services Inc., April 2018)
 - Fluvial Geomorphological Assessment Upper West Side, City of Hamilton DRAFT (GeoMorphix, March 2018)
 - Municipal Comprehensive Review Process Employment Land Review – Meadows of Glanbrook (Corbett Land Strategies Inc, September 2017)
 - Glanbrook Industrial Park, Hamilton Environmental Impact Study (Natural Resource Solutions Inc., March 2018)

It is acknowledged that amendments to this document may be required at the time when the Draft Plan application(s) for the community are prepared.

2.0 EXISTING CONDITIONS

The Upper West Side lands are situated in the headwaters of the Main Channel Twenty Mile Creek Subwatershed near the headwaters of the Upper Twenty Mile Creek Subwatershed. The subject lands fall under the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA). **Figure 200** illustrates existing drainage patterns and subcatchments within the Upper West Side lands. Existing drainage patterns have been verified through detailed topographic field survey, site reconnaissance and review of drainage reports provided by the City.

The northern portion of the Upper West Side lands contains several tributaries that traverse the site from west to northeast and cross Twenty Road West into existing developed lands to the north. A number of small ponds have formed in depressions within the site's agricultural areas.

The existing land use in the study area is predominantly agricultural, which has led to modification of the headwater features by farming activities. In general, the headwater features are poorly defined with ephemeral or intermittent flow. There are a number of environmental corridors, woodlots and wetlands that form part of the Natural Heritage System (NHS). These are further described in the Environmental Impact Study (EIS) prepared by NRSI.

3.0 PROPOSED GRADING & ROADS

3.1 GRADING CONSTRAINTS

The following grading constraints were identified for the Upper West Side lands and were considered in the development of the grading plans (refer to **Figures 300 and 301**):

- The existing hydro corridor along the northern limit of the site.
- The setbacks and existing ground elevations along the existing woodlots and wetlands were maintained to ensure adequate protection of features and to maintain drainage patterns in / out of the natural areas.
- The proposed road alignments and storm drainage.
- The existing grades along the hazard limits (watercourse, meander belt, etc.).
- Future stormwater management facility elevations
- The existing and proposed elevations at the intersections with the boundary roads, namely Twenty Road West, Upper James Street, Dickenson Road West, and Glancaster Road are considered to be grading constraints since the proposed subdivision roads must tie into the existing / future road elevations.
- The property line elevations for the existing and/or currently non-participating owners
- General grading constraints include conforming to the City's road grading and lot grading criteria, as well as ensuring that the minimum cover on the servicing infrastructure was maintained. The City's standard minimum road grade is 0.75% for all ROW types. Road grades within this study area are in the order of 1%.
- Urban design guidelines for the AEGD have defined road sections for the area and consist of a minimum 3 m width at the edges of the road surface for swales and LID bioretention/infiltration features.
- At key locations side swales have been introduced to convey road drainage from the LIDs into the NHS, this will avoid the major system and road LID swales from exceeding their conveyance capacities.
- The roads have been graded to ensure positive drainage of minor flows to the swales/LID features and positive drainage of major system flows towards the SWM facilities/dry ponds. In general, the major system drainage can be directed overland to the SWM ponds via roadways and swales with the exception of Street A (the Garth Street extension). This road is considered an urban arterial road/emergency route and the depth of major overland flows may not exceed the elevation of the crown of the Road (Section 2.2.1 of the City's document 'Criteria and Guidelines for Stormwater Infrastructure Design' (September 2007).
- The outlet elevations for the Dry Ponds/SWM facilities were fixed based on the receiving outlet elevations

3.2 ROADS

The approved Transportation Master Plan (TMP) for the Airport Employment Growth District (AEGD) lands assessed and recommended the collector road network and associated transportation infrastructure required to support the development of the Upper West Side lands. The TMP developed the alignment, cross-section and preliminary design plan for the collector roads and spine road (Street A/Garth Street). The TMP supported the Secondary Plan process.

The existing boundary roads consist of City of Hamilton roads. The proposed design the Garth Street extension to Dickenson Road is currently undergoing a combined Class EA process in conjunction with the planning applications associated with the development of the subject site.

The internal road design will adhere to the City of Hamilton concepts presented in the AEGD Stormwater Master Plan and Urban Design Guidelines. Given the unique and progressive stormwater management and LID concepts presented for the ROW areas, these alternative standards will need to be discussed with City staff. The proposed ROW widths are noted on the Draft Plans. The proposed layout of the collector roads generally conforms to the road layout concepts presented in the AEGD Transportation Master Plan with some minor differences. The road layout will be refined further in future submissions and in consultation with the City of Hamilton and the consultant team.

A geotechnical investigation has recently been completed for the proposed limits of the draft plan, including road alignments that will accommodate the deep sanitary trunk sewers. Future work for the remaining Upper West Side lands will be completed at a later date by others.

The ROW cross-section details for street within the UBE areas are shown on **Figures 303 to 305**.

Additional studies are on-going or planned for the boundary roads, particularly Glancaster Road and Twenty Road West. These studies will be coordinated with the requirements of the subject lands and the study recommendations will be reflected in the eventual Draft Plan applications. This will include, but not be limited to road alignments, servicing, stormwater management / drainage, and environmental impacts.

3.3 SERVICES & UTILITY CONSIDERATIONS

Deep sanitary trunks are required to service future developments to accommodate the low-lying areas. The final elevations of the sanitary trunk sewers will be refined in consultation with the geotechnical engineer based on the recently completed (June 2018) hydrogeological investigation by EXP Services Inc.

A preliminary geotechnical investigation has recently been completed and provides construction recommendations including fill requirements, servicing, dewatering considerations, pavement structure, and foundation design. At this time, it has been assumed that the City criteria for pavement structure for local roads will be applied unless otherwise informed by future studies.

District energy is recommended by the AEGD study for the employment lands within the greater study area. Additional underground servicing can potentially be allocated for a proposed district energy system in the subject lands, if desired for the residential lands. The ROW cross-section included in **Figures 303 to 305** show conceptual sizing and spacing for this system based on known district energy requirements from other jurisdictions. The relatively wide ROWs recommended by the City of Hamilton for the AEGD allow ample room for these additional servicing lines within the ROW and presents an excellent opportunity to explore district energy options for the AEGD lands.

The Upper West Side Landowners Group will be undertaking an evaluation of existing utility capacity and requirements for the servicing of the subject lands. In general, the main utility infrastructure will be available along the boundary roads (Twenty Road West, Upper James Street, Dickenson Road West, and Glanaster Road). This includes Hydro One, Bell, Enbridge, and Rogers. Typically, Bell, Enbridge and Rogers design their infrastructure concurrently with the Hydro One design. Note that some utilities may advance their design of the boundary road services prior to development of the Upper West Side lands.

4.0 DRAINAGE & STORMWATER MANAGEMENT

Figure 200 and **Figure 500** illustrate the existing and ultimate overall drainage areas (respectively) contributing to the various outlets and SWM facilities as well as major system flow paths based on the proposed grading design. Under proposed conditions, the lands tributary to the Twenty Mile Creek culvert outlets along Twenty Road West will be consolidated into one major storm outlet (T-29/Pond 8) that will service the north portion of the Upper West Side lands. This is in accordance with the approved AEGD SWMP as it indicates the following:

To appropriately manage drainage from future development within the AEGD study area which flow into existing private stormwater facilities in communities adjacent to the study area on the north side along Garner Road and Twenty Road, legal access for the purposes of inspection, maintenance or facility upgrade by the City will be required. As such, it is recommended that development draining into existing private facilities be precluded until such time as the City retains easements to access these facilities.

The existing drainage systems along Twenty Road West, Upper James Street and Dickenson Road West provide outlets for the future Upper West Side SWM facilities and corresponding catchment areas.

While consolidation of flows is proposed for the north portion of the site (to T-29/Pond 8), the minor headwater reaches along Twenty Road West will be maintained to continue to provide surface conveyance and riparian rights (although with reduced contributing drainage areas) to the adjacent landowners.

With the development of the UBE lands, the majority of drainage to the outlets and watercourse/wetland features can generally be maintained similar to existing conditions.

Note that additional survey information and coordination with the City is required to finalize the existing drainage patterns.

4.1 PROPOSED STORMWATER DRAINAGE SYSTEM

The proposed stormwater drainage system for the Upper West Side lands incorporate an innovative dual drainage concept (minor and major systems) as recommended in the AEGD SWMP. This involves two distinct storm drainage subsystems:

- the design of a minor system (LID conveyance controls) and
- a major system (overland flow routes, stormwater management dry-ponds, etc.)

The proposed minor system proposed will consist of Low Impact Development (LID) conveyance systems designed to remove excess surface runoff from lot level source controls and road right of ways (ROWs) that are produced by more frequent storms, and deliver it to end-of pipe facilities. This will take the form of LID swales within the edges of ROWs that are designed to accommodate flow from the 1:5 year storm without surcharging in accordance with the City's standards and IDF parameters. Typical sections of the various size roadways within the draft plan, which indicate the LID swale locations, are indicated in **Figures 303** through **305**.

The proposed major system will consist of the overland flow route in which the runoff flow in excess of the capacity of the minor system/LID swales will be conveyed. The major system is largely portions of roadways but can also include features such swales, ditches, natural channels, drainage easements and end-of-pipe stormwater management facilities. The subject lands will be graded in such a way to ensure the minor and major systems have adequate conveyance capacity and discharge to a free outlet.

At key locations side swales have been introduced to convey road drainage from the LIDs into the NHS, this will avoid the major system and road LID swales from exceeding their conveyance capacities.

It should be noted that major overland flows cannot exceed 0 mm depth above crown of the road for Arterial and Emergency Routes, nor can major overland flows cross an arterial road (i.e. must be captured and conveyed either through a culvert or storm sewer to an approved outlet location) in accordance with City policies.

The Dual Drainage Concept (Minor and Major Systems) approach is consistent with the City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design, (Philips Engineering, 2007).

The major and minor drainage systems for the subject lands have been designed to convey storm runoff to the proposed flood control/dry SWM facilities prior to discharge to the various Twenty Mile Creek outlets. **Figure 500** illustrates the drainage for the UBE lands and receiving SWM facility.

4.2 STORMWATER MANAGEMENT

The June 2011 Airport Employment Growth District (AEGD) Subwatershed Study and Stormwater Master Plan (SWMP) and accompanying Implementation Document (April 2017) provide a detailed strategy and recommendations for stormwater management under post-development land use conditions and indicated preliminary locations for SWM facilities.

An end-of-pipe stormwater management facilities (dry pond) are proposed to treat the post-development drainage as illustrated in **Figure 500**. The use of open water facilities such as wet ponds and constructed wetlands were not possible in order to comply with Transport Canada restrictions (Document TP 1247) related to airport safety (avoidance of bird strikes).

The proposed drainage plan deviates considerably from the existing drainage plan with respect to consolidation of drainage outlets and redirection of flows from the existing culverts along Twenty Road West to the outlets along Upper James Street.

Under proposed conditions, the Twenty Mile Creek culvert outlets along Twenty Road West will be largely consolidated into one major storm outlet that will service the Upper West Side lands tributary to Twenty Mile Creek. Some minor drainage will be maintained to the tributaries north of Twenty Road West to maintain environmental features and protect the riparian rights of downstream landowners

In addition to the end-of-pipe SWM facilities used for quantity control, LID BMP features will be utilized throughout the site in order to satisfy requirements listed in the Stormwater Master Plan and the Eco-Industrial Design Guidelines (EIDG) related to pre-development water balance and

water quality. LID BMPs will be designed to match pre-development infiltration, evapotranspiration, and runoff wherever possible. Detailed information related to locations and sizing of LID BMP features will be provided at the detailed design stage.

This section of the report identifies the SWM targets and design criteria for the UBE (applicable to the entire community). The hydrologic modelling of pre-development conditions to establish unit flow rate targets for quantity (flood) control purposes (2-year through 100-year events) was completed as part of the AEGD SWMP by Aquafor Beech/Dillon Consulting and has been updated in the June 2018 FSR to reflect the refined drainage information and proposed drainage diversions within the study area.

Preliminary flow targets and volume requirements were established for the SWM facilities in the June 2018 FSR to:

- Ensure that existing flow rates downstream of the subject lands are not exceeded under post-development conditions, thereby providing flood protection for properties downstream of the subject lands;
- Confirm through modeling that the unit volumes identified in the AEGD SWMP are appropriate and/or recommend revised values;
- Provide adequate drawdown time / erosion control to protect the form and function of watercourses downstream of the SWM facilities (for those dry ponds providing erosion control in addition to flood control).
- Ensure that the MOECC Enhanced (Level 1) stormwater quality treatment of runoff is provided;
- Maintain groundwater recharge volumes through the use of low impact development and other best management practices. The AEGD SWMP also states that a minimum of 10mm of rainfall must be infiltrated on-site for water quality control and that it is expected that the “best achievable” infiltration volume should be pursued using any available LID BMPs. When the MOECC’s updated LID Stormwater Management Guidance Manual is released, the new targets will supersede the existing AEGD SWMP targets wherever they are more stringent. These targets are expected to require capture and control of the 90th percentile event (28mm to 29mm) along with Level 1 Enhanced quality control.
- Maintain water balance to wetland features and existing drainage outlets where required.
- Developments within the AEGD must comply with the generalized control targets from the MOECC and AEGD minimum targets. The MOECC erosion control criteria include capture of the 25mm event and release over a 24-hour period. Alternatively, the MOECC allows for controlling the frequency and duration of site outflows such that the in-stream index of erosion potential is not increased.

The AEGD SWMP and the EIDG require developments to utilize a suite of LID source and conveyance controls in combination with end-of-pipe dry-ponds as part of a treatment train approach. LID BMPs will be used to achieve the MOECC Enhanced (Level 1) treatment requirements as they provide water quality improvements through a variety of mechanisms. In traditional stormwater management systems, water is collected and conveyed using features such as gutters, curbs, catch-basins, storm sewers, oil-grit separators, or ponds. In these systems, only the end-of-pipe SWM components provide quality improvements to the site discharge. In a LID BMP

treatment train, each component that collects and conveys drainage to the final outlet provides some quality control benefits. In a LID BMP treatment train, water quality improvements from one LID BMP are compounded by the next LID BMP in the train before discharging into a final end-of-pipe feature.

LID BMP source controls provide treatment of runoff where it falls, allowing rain water to be utilized as a resource instead of treated as a waste. LID BMPs are the industry best practice for providing on-site infiltration and source control and will be essential to meeting predevelopment water balance/flow management criteria related to flood control, erosion control, quality control, infiltration, and protection of natural features.

The Upper West Side development will prioritize well-distributed source controls in order to provide treatment of rainfall wherever it lands. LID BMP source controls will be allocated as site conditions allow. The following suite of LID source control measures from the AEGD SWMP will be evaluated for site feasibility.

- Rainwater Harvesting
- Green Rooftops
- Downspout Disconnection
- Soakaway Pits
- Bioretention and Special Bioretention
- Soil Compost Amendments
- Tree Clusters
- Filter Strips
- Permeable Pavement

LID BMP conveyance features, such as bio-filters, bio-retention swales, grassed channels, and subsurface perforated pipe systems, will provide quality and infiltration improvements to runoff across the site before it is discharged into the proposed end-of-pipe facilities. LID BMP conveyance features will be designed to function as the minor system for the AEGD wherever possible.

5.0 SANITARY SERVICING

The Upper West Side community are tributary to the Woodward Avenue WWTP. Wastewater is conveyed to the Woodward WWTP by a series of existing gravity trunk sewers and a series of Sanitary Pump Stations (SPS).

The proposed wastewater servicing strategy is shown in **Figure 800**. This strategy has been developed based on the following key inputs and objectives:

- Adhere to the intent of the AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016)
- Provide for a logical and efficient extension of services within the Upper West Side Lands
- Optimize existing infrastructure capacities where possible
- Facilitate the Garth Street Extension from Twenty Road to Dickenson Road, and surrounding development

Existing sanitary infrastructure available to service the Upper West Side Lands includes:

- **Twenty Road SPS (HC018) located at the northwest corner of Twenty Road West and Upper James Street** – The existing Twenty Road Sewage Pumping Station (SPS) was upgraded in 2015 to increase the firm capacity from 88 l/s to 590 l/s in order to provide additional capacity for lands in the northeast corner of the AEGD Secondary Plan area, including portions of the Upper West Side Lands. The limits of the area that can be serviced by this pumping station in accordance with the AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016) and are shown on **Figure 800**. The service area within the Upper West Side lands is approximately 130 hectares.
- **Existing 750mm diameter sanitary trunk sewer on Upper James St. between Twenty Road West and Dickenson Road** - This sewer discharges into the Twenty Road SPS, and has available capacity to service additional lands, including the Twenty West lands with frontage along Upper James Street.

The population densities referenced in the AEGD / Master Servicing Plan for these lands are approximately 37.5 people per hectare. This is in contrast to the City's typical values of 125 to 750 people per hectare for industrial land use. With respect to planned or available capacities in these sewers for the subject lands, it is understood that the flow capacity is based on the lower population density, and on the *gross* area contributing to each sanitary outlet. It is understood that through refinement of the sanitary drainage plans and development limits, the actual sanitary catchment areas will decrease but the total allowable flow will remain constant, translating into a higher population density that would be more in line with the City's standards.

Sanitary design sheets have been completed for the Twenty Road Sewage Pumping Station (identified to have capacity for approximately 200 ha at approximately 37.5 people / ha in the Master Plan – see **Figure 801**) and for the Dickenson Road Trunk sewer (identified to have capacity for the balance of the AEGD area which is approximately 190 ha at approximately 37.5 people / ha based on the Cole Engineering design). These estimates translate to a contributing population of approximately 7500 at the Twenty Road Sewage Pumping Station and a contributing population of approximately 7125 at the Dickenson Road Trunk (at Upper James Street). The

corresponding allowable flows are 184.4 L/s and 176.2 L/s, respectively. These estimates are based on the gross areas and low population densities.

Based on analysis of the subject lands, it is proposed to drain approximately 175 ha at (approximately 18800 people) for a total of approximately 290 L/s to the Twenty Road West Pump Station, and 86 ha (7270 people) for a total of 136 L/s to the Dickinson Road trunk.

The following table compares the flows allotted for in the Master Servicing Plan / Dickinson Road Trunk sewer design versus the proposed UBE flows. A sanitary design sheet was prepared as the basis for these calculations and is included with **Figures 800 and 801**.

Parameter	Twenty Road Sewage Pumping Station		Dickenson Road Trunk at Upper James Road	
	Master Servicing Plan / AEGD	Proposed UBE	Dickinson Road Trunk Sewer Design	Proposed UBE
Population Density [p/ha]	+/-37.5	RESIDENTIAL @ 175, INDUSTRIAL @ 125	+/-37.5	INDUSTRIAL @ 125
Drainage Area [ha]	+/-200 ha (gross area)	+/-175 ha (net area based on NHS limits, ponds, roads (~20% of development area) and parks (5% of development area))	+/-190 ha (gross area)	+/-86 ha (net area based on NHS limits, ponds, roads (~20% of development area) and parks (5% of development area))
Population	7500	18800	7125	7270
Dry Weather Flow [L/c/day]	104.4	217.8	100.2	101.8
Peaking factor	3.34	2.78	3.38	3.36
I/I Flow [L/s]	80	69	76	34.5
Total Flow [L/s]	184.4	286.8	176.2	136.3

It is recognized that further coordination with the City will be required prior to Draft Plan approval to determine how to best accommodate or phase the proposed flows shown in the preceding table. For example, a portion of the industrial lands tributary to the Twenty Road West Pumping station could be directed to the future Dickinson Road trunk, since the depth of the Dickinson trunk allows for gravity drainage for the majority of the UWS lands. Furthermore, there may be opportunities to optimize available capacity in the existing system refine the design of the future trunk sewer. We understand that an update to the Master Servicing Plan may be required to support the proposed development and alterations to the sanitary drainage strategy.

5.1 PROPOSED DEVELOPMENT CHARGE INFRASTRUCTURE

The AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016) identified 'Development Charge' wastewater infrastructure required to service the greater AEGD area:

- **Proposed 600mm & 750 mm diameter Dickenson Trunk Sewer (MH11-S-14 & MH10-S-14) and Pumping Station** - This sewer will be ultimately be extended from the Centennial Trunk Sewer in Binbrook westerly to Glancaster Road, and will provide wastewater collection capacity for the AEGD Secondary Plan Area including portions of the Upper West Side Lands. Currently, the City is proceeding with a Class EA for the widening of Dickenson Road from Upper James Street to Book Road in 2018. The City is proceeding with the detail design and construction of the Dickenson Road Trunk Sewer and Pumping Station between Binbrook and Glancaster Road, with construction starting in 2020. It will likely take 3 or 4 years to complete construction all the way to Glancaster Road. The proposed 600 mm (MH11-S-14) and 750 mm (MH10-S-14) trunk sewers along Dickenson Road, between Glancaster Road and Upper James Street will service the Upper West Side lands as shown on **Figure 900**.
- **Proposed 375 mm diameter Twenty Road West sewer (MH1-S-14)** This sewer will be extended westerly from the existing 750 mm diameter sewer on Upper James Street to future Street B along Twenty Road West. This sewer will service the lands between Twenty Road West, Glancaster, Upper James and the east-west NHS, as shown on **Figure 900**.
- **Proposed 375 mm diameter Glancaster Road sewer (MH16-S-14)** This proposed sewer will be extended northerly along Glancaster Road from the Dickenson Road West sanitary trunk sewer. The requirement of this sewer should be reviewed to determine if the service area can be accommodated by the Dickenson Road West sanitary sewers.

5.2 TIMING OF DEVELOPMENT

With the extension of a new sanitary sewer on Twenty Road West from Upper James Street to Future Street B and the utilization of the planned capacity in the Twenty Road Pump Station, the development of the Upper West Side lands could proceed immediately. Development of the lands south of NHS will require the completion of the Dickenson Trunk Sewer between Binbrook and Glancaster Road, which will likely be completed by 2023/4.

6.0 WATER SERVICING

This section describes the existing and planned water infrastructure servicing the Upper West Side lands, as well as the proposed services required for the UBE area.

The Upper West Side lands are located within Pressure District 6. The proposed water servicing strategy is shown in **Figure 900**. This strategy has been developed based on the following key inputs and objectives:

- Adhere to the intent of the AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016).
- Provide for a logical and efficient extension of services within the Twenty Road Lands.
- Optimize existing infrastructure capacities where possible.
- Facilitate the Garth Street Extension from Twenty Road to Dickenson Road, and surrounding development.

The existing water infrastructure available to service the UBE area includes:

- 600mm watermain on Glancaster Road from Dickenson Road to Twenty Road West.
- 600mm, 400mm and 300mm watermains on Twenty Road West between Glancaster Road and Upper James Street.
- 400mm watermain on Upper James Street from Twenty Road West to Dickenson Road.
- E300mm watermain on Dickenson Road from Upper James Street to approximately 1100m west.

The AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016) confirms that the Upper West lands can be serviced by connections to the existing watermains on the perimeter roads.

Construction of a new 400mm watermain from Twenty Road West to Dickenson Road West in conjunction with the Garth Street Extension, and extension of the existing watermain on Dickenson Road to the Garth Street Extension, will provide adequate water supply for the initial stages of development for the Upper West lands. Subsequent development is easily serviced from the existing perimeter watermains. This is consistent with the phased servicing strategy shown in the AEGD Phase 2 Water and Wastewater Master Plan Update (December 2016).

6.1 TIMING OF DEVELOPMENT

No external water system upgrades are required to accommodate development of the UBE lands. Timing of development for the UBE lands is not restricted by the existing water distribution system capacity.

7.0 FUTURE STUDY REQUIREMENTS

The City and study team have identified the following items requiring further study. It is our understanding that these items can be completed through a Secondary Plan / Draft Plan approval process. There are long-term solutions to ultimately service the UBE lands in the fullness of time, but we recognize that current infrastructure capacity may require phasing of the entire development area and more detailed information is required prior to any Draft Plan or servicing approvals take place.

- Concept plan (Secondary Plan & Draft Plan) level of detail to be provided indicating local road networks and land use.
- Phasing and implementation plans based on land owner participation and available / future infrastructure capacity.
- Functional Servicing plans including grading, drainage, and sewer design.
- Servicing Capacity details including allocation policies for project growth in the existing and proposed urban boundaries.
- Front-ending cost policies and agreements to be established
- A stormwater management plan demonstrating conformance to the AEGD Subwatershed Study & SWM Plan Implementation, with the necessary adjustments and considerations for residential lands. This document will include LID design and water balance assessments as well as preliminary pond design information, major and minor system conveyance, etc.
- Incorporation of Boundary Road EA work (Twenty Road West and Glancaster Road)
- Completion of the UWS Master Drainage study
- A comprehensive wastewater servicing study for each sanitary catchment area and outlet including:
 - Characterization and hydraulic analysis of interim conditions, without the Dickenson Road diversion trunk in place. This condition will assume English Church Pump Station operating at 100% capacity allocation, and include development of existing urban lands within the Twenty Road Sewage Pumping station gravity catchment to 2031;
 - Characterization and hydraulic analysis of anticipated 2041 conditions, with the proposed Dickenson Road diversion trunk in service;
 - Functional design of any new sewers external to the subject lands that are required to convey wastewater to the City's existing sewer network, including life cycle cost analysis. Proposed sewer capacities will account for future external drainage contributions from other undeveloped lands, to the natural drainage boundary.

- Confirmation that the Upper James trunk sewer and Twenty Road Sewage Pumping station have sufficient spare capacity for the subject lands as well as anticipated development to 2041 within the existing urban lands in the Twenty Road PS catchment.
 - Evaluation of interim capacity in the existing system to allow a portion of the subject lands to proceed in advance of the Dickenson Road trunk sewer.
- A comprehensive water servicing study including:
 - Watermain hydraulic analysis for Pressure Zone #6, using anticipated 2041 development conditions;
 - Functional design of watermains external to the subject lands that are required to convey water from the City's existing watermain network, including life cycle cost analysis.
 - Confirmation that the existing water infrastructure network (including watermains, pump stations, and storage) has sufficient spare capacity for the subject lands, as well as anticipated development to 2041 within the existing urban lands in the Pressure Zone #6 boundary.
 - Evaluation of interim capacity in the existing system to allow a portion of the subject lands to proceed based on existing water distribution system capacity.

Sincerely,

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